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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/851,922	05/10/2001	Masafumi Sakamoto	134.137	4415

7590

02/27/2003

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EXAMINER

JONES, JUDSON

ART UNIT PAPER NUMBER

2834

DATE MAILED: 02/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/851,922

Applicant(s)

SAKAMOTO, MASAFUMI

Examiner

Judson H. Jones

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 December 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 20-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 2 and 3 is/are allowed.
- 6) ☒ Claim(s) 1 and 20-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Response to Arguments

Applicant's arguments filed 12/31/2003 have been fully considered but they are not persuasive. Applicant states on page 7 of the 12/26/2002 response, "Sakamoto discloses a hybrid stepping motor ...". However Sakamoto 5,386,161 states in column 2 lines 14-22, "The reason why such a disadvantage is generated in such a conventional three-phase hybrid stepping motor is that since its rotor is of the hybrid type, each of the magnetic bodies 2-1 and 2-2 of FIG. 2 is constituted by a lamination of magnetic iron plates ..." As shown in figures 3 and 4, the rotor of Sakamoto is not of the hybrid type. In column 6 lines 23-31 Sakamoto states, "The stepping motor according to the present invention has a further advantage that the facing area between the rotor teeth and the stator teeth is about twice or more as large as that in a hybrid type stepping motor ..." Contrary to Applicant's argument, Sakamoto does not appear to consider his device a hybrid motor. In regard to Bedford, the sentence in the office action of 9/25/2002 "However Bedford figure 4a discloses three phase windings, the winding of one phase wound around a first pole and the third pole of a six pole permanent magnet machine and m pieces of S pole and m pieces of N pole formed alternatively on the 6m pieces of stator main pole for the purpose of improving the efficiency of the motor by making the wave shape of the back EMF and the wave shape of the energizing voltage similar as described in column 1 lines 5-18." is incorrect. The number of phases and the polarity of the poles on the stator have nothing to do with making the wave shape of the back EMF and the wave shape of the energizing voltage similar. Bedford makes the waves of energizing voltage similar to the back EMF voltages by using switching circuits that power a brushless motor. For Bedford's purposes, a rotor as shown in figure 3 of Sakamoto '161 or a rotor as shown in figure 1 of the instant application would work as well.

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What Bedford teaches of relevance to the instant invention is that when a motor is laid out with a certain number of phases, stator poles and rotor poles, if the motor turns out to have multiple stator poles of the same phase facing rotor poles of different polarity, then some of the stator poles have to be wound in the reverse direction for the motor to work.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1 and 20-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakamoto 5,386,161 in view of Bedford 3,678,352. Sakamoto '161 discloses the magnet type stepping motor having a cylindrical permanent magnet rotor with alternating N and S poles and having three phase windings and 6m pieces of stator main poles with one phase wound around the first and every third pole but does not show m pieces of N pole and m pieces of S pole formed alternately on the 6m pieces of stator main pole. However Bedford figure 4a discloses three phase windings, the winding of one phase wound around a first pole and the third pole of a six pole permanent magnet machine and m pieces of S pole and m pieces of N pole formed alternately on the 6m pieces of stator main pole for the purpose of making the motor function properly. As shown in figure 4a, if the stator pole windings are not reversed, the motor would not operate because the stator poles face magnet poles of opposite phase. Since Sakamoto and Bedford are both permanent magnet motors driven by three phase voltage supplies, it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized the winding arrangement of Bedford in the circuit of Sakamoto in order to make the

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motor operate properly if, after the motor is laid out with a certain number of phases, stator poles and rotor poles, the layout produced stator poles facing rotor poles of opposite polarity.

In regard to claim 20-23 and 25-28, see Sakamoto figure 3.

Claims 1 and 24 are alternatively rejected under 35 U.S.C. 102(b) as being anticipated by Bedford in view of Ray and Crosetto et al. 4,795,936. Bedford figure 4a discloses three phase windings, the winding of one phase wound around a first pole and the third pole of a six pole permanent magnet machine as shown in figure 3a but does not disclose his device as usable for a stepping motor or disclose a cylindrical permanent magnet. Bedford discloses opposing stator poles of the same phase but alternating polarity in column 7 lines 3-7 for the purpose of permitting the machine to operate properly. In regard to stepping motors, Ray teaches in column 5 lines 49-60 and in figure 1 using a six stator pole, two rotor pole machine as first a rotating and then a stepping motor for the purpose of controlling an aircraft aileron, an automatic door opener, for braking or for robotic equipment as described in column 1 lines 13-24. Since Bedford and Ray are both from the same field of endeavor as shown by their US PTO classifications, it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized the motor of Bedford as a stepping motor for controlling the aileron, in a robotic machine, or to control an automatic door opener in order to increase the usefulness and thus the marketability of the motor. Bedford as modified by Ray discloses the stepping motor but does not disclose using a cylindrical permanent magnet for a rotor. Crosetto et al. teaches in column 11 lines 6-9 that a smooth cylindrical surface on the rotor gives an aerodynamic shape to the rotor. Since Crosetto et al. and Bedford as modified by Ray are both from the same field of endeavor, it would have been obvious at the time the invention was made for one of ordinary

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skill in the art to have utilized a cylindrical shape to the rotor in order to increase the efficiency of the motor by making the rotor more aerodynamic.

Allowable Subject Matter

Claims 2 and 3 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

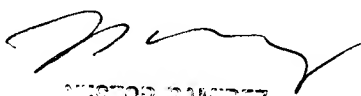
The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not disclose or teach a three phase permanent magnet stepping motor with a number of rotor poles as specified in the formula in claims 2 and 3. Sakamoto 5,386,161 discloses a formula in the abstract of the disclosure where $P=12n+4$, not $12n+2$.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Judson H Jones whose telephone number is 703-308-0115. The examiner can normally be reached on 8-4:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor Ramirez can be reached on 703-308-1371. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3431 for regular communications and 703-305-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

JHJ
February 15, 2003


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